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PATENT SPECIFICATION

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(19)

(54) THE TREATMENT OF PLANOGRAPHIC PRINTING BLANKS

(71) We, VICKERS LIMITED, a British Company, of Vickers House, Millbank Tower, Millbank, London, S.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the treatment of planographic printing blanks.

In addition to having two lithographic layers of complementary lithographic character, a planographic printing blank may be provided with a protective surface layer serving, for example, to inhibit spurious abrasion of one of the other layers during imaging of the blank. After the blank has been imaged, the protective surface layer is removed so as to expose a lithographic surface composed of image regions of one lithographic character and non-image regions of the opposite lithographic character. To permit satisfactory results with the printing plate thus formed however, the exposed lithographic surface may require treatment to achieve a sufficient contrast between the lithographic properties of the image and non-image regions.

According to one aspect of the present invention, there is provided a treatment solution for a planographic printing blank which, in addition to two layers of different lithographic character, is provided with a soluble protective surface layer intended to be removed, after imaging of the blank, so as to expose a lithographic surface composed of image regions of a first lithographic character and non-image regions of a second lithographic character, the solution comprising:

a solvent for removing the protective surface layer so as to expose the said lithographic surface, the solvent comprising at least one member of the group consisting of acetone, ethanol, monoethylene glycol, water and propanol;

a desensitizing agent for promoting the water-receptivity of the exposed surface regions of one lithographic character, this agent comprising at least one member of the group consisting of gum arabic, mesquite gum, sodium carboxymethyl cellulose, sodium alginate, ammonium alginate, sodium hexametaphosphate, starch acetate, phosphoric acid, salts of phosphoric acids, citric acid, citrate salts, tartaric acid, tartrate salts, oxalic acid and oxalate salts.

a humectant for maintaining the water-receptivity of the exposed surface regions of the said one lithographic character for a period of time long enough to allow the treated blank to be used for printing, the humectant being a dihydric or polyhydric alcohol:

and a high-boiling-point solvent for promoting the ink-receptivity of the exposed surface regions of the other lithographic character, the high-boiling-point solvent comprising at least one member of the group consisting of diacetone alcohol, ethyl lactate, ethylene glycol monoethyl ether acetate, and diethylene glycol monobutyl ether.

The nature of the solvent employed in any particular case for removing the protective surface layer evidently depends upon what particular single or multi-constituent solvent will dissolve the particular material of this layer. Where the planographic printing blank is intended for office use, the protective surface layer is preferably water-soluble or alcohol-soluble and, consequently, the solvent employed should be water or alcohol (ethanol or methylated spirits) or a water/alcohol mixture.

Of the possible substances employable as the desensitizing agent for promoting water receptivity, the preferred substance is phosphoric acid, more especially if the potentially water-receptive surface regions are of aluminium.

Among the dihydric or polyhydric alcohols suitable for use as the humectant there are diethylene glycol, glycerine, trimethylol propane, sorbitol, hexylene glycol, hexantriol and monoethylene glycol.

According to another aspect of the present invention, there is provided a method of treating a planographic printing blank which comprises, in addition to two layers of different lithographic character, a protective surface layer intended to be removed, after imaging of the blank, so as to expose a lithographic sur-

face composed of image regions of a first lithographic character and non-image regions of a second lithographic character, wherein following imaging of the blank the latter is treated with a treatment solution as defined hereinbefore, so as to remove the protective surface layer, promote the water-receptivity of the exposed surface regions of the said one lithographic character, maintain the water-receptivity of these regions for a period long enough to permit the treated blank to be used for printing, and promote the ink-receptivity of the exposed surface regions of the other lithographic character.

It will be appreciated that the high-boiling-point solvent employed for promoting ink-receptivity should, while being soluble in the treatment solution as a whole, have sufficient oleophilic properties to prepare the potentially oleophilic exposed surface regions of the lithographic surface for ink-receptivity.

Reference will now be made, by way of example, to the accompanying drawing, in which:—

Figure 1 is a cross-sectional view of a planographic printing blank prior to imaging,

Figure 2 is a cross-sectional view of the blank after imaging, and

Figure 3 is a cross-sectional view of the blank after treatment with a treatment solution embodying the present invention.

The illustrated planographic printing blank comprises an electrically non-conductive potentially hydrophobic but ink-receptive (oleophilic) underlayer 1 made for example, of plastics material, e.g. polyester. On the underlayer 1 is provided an electrically-conductive potentially hydrophilic and ink-repellent overlayer 2, which is for example a vapour-deposited aluminium layer with a thickness of about 0.05μ. The overlayer 2 is coated with a solid but soluble protective surface layer 3 intended to inhibit mechanical abrasion of the overlayer 2 during inscription of the blank.

Inscription of the blank is effected by an electrical stylus (not shown). As relative movement is brought about between the blank and the stylus, stylus current is passed between the stylus and the blank so as to cause local removal of material from the overlayer 2, together with overlying material of the protective surface layer 1, at regions over which the stylus travels. This results in the exposure of the underlayer 1 beneath these regions. As is apparent from Figure 2, the inscription process results in exposure of potentially hydrophobic and ink-receptive image regions 4 constituted by the exposed regions of the underlayer 1.

Before the inscribed blank can be used for planographic printing, the remainder of the protective surface layer 3 must first be removed and the exposed surface of the inscribed blank suitably prepared. For this purpose the inscribed blank is treated with a treatment solution which comprises a solvent serving to remove the protective layer 3, a desensitizing agent serving to promote the water-receptivity of the thus exposed non-image regions 5 provided by the overlayer 2, a humectant serving to maintain the water-receptivity of these surface regions up to the time of printing, and a high-boiling-point solvent serving to promote the ink-receptivity of the image regions 4 provided by the underlayer 1.

The particular treatment solution employed may for example have any one of the formulations given in the following three examples:

EXAMPLE 1

	%
88% H_3PO_4	2
Diethylene Glycol	10
Ethyl Lactate	10
Water	78
	100

In this case, water is the solvent for removing the protective layer 3, phosphoric acid is the desensitizing agent, diethylene glycol is the humectant, and ethyl lactate is the high-boiling-point solvent.

EXAMPLE 2

	%
88% H_3PO_4	2
Diethylene Glycol	10
Diethylene Glycol Monobutyl Ether	10
Isopropanol	38
Water	40
	100

In this case, the solvent for removing the protective surface layer 3 is a mixture of water and isopropanol, the desensitizing agent is phosphoric acid, the humectant is diethylene glycol, and the high-boiling-point solvent is diethylene glycol monobutyl ether.

EXAMPLE 3

	%
88% H_3PO_4	2
Diethylene Glycol	10
Diacetone Alcohol	10
Ethanol	48
Water	30
	100

In this case, the solvent for removing the protective surface layer 3 is a mixture of ethanol and water, the desensitizing agent is phosphoric acid, the humectant is diethylene glycol, and the high-boiling-point solvent is diacetone alcohol.

In some cases, the treatment solution employed may use one and the same constituent

for more than one function. In some formulations, for example, monoethylene glycol may be used both as a solvent for removing the protective surface layer and as a humectant for maintaining the water-receptivity of the thereby exposed non-image regions provided by the overlayer.

Protection is hereby disclaimed for any treatment solution having substantially the following formulations (see our British Patent Specification No. 1,470,658):—

10 Parts Diethylene Glycol
10 parts Ethyl Lactate
2 parts 88% H_3PO_4
38 parts Ethanol
40 parts Water.

Subject to the foregoing disclaimer,
WHAT WE CLAIM IS:—

1. A treatment solution for a planographic printing blank which, in addition to two layers of different lithographic character, is provided with a soluble protective surface layer intended to be removed, after imaging of the blank, so as to expose a lithographic surface composed of image regions of a first lithographic character and non-image regions of a second lithographic character, the solution comprising:

a solvent for removing the protective surface layer so as to expose the said lithographic surface, the solvent comprising at least one member of the group consisting of acetone, ethanol, monoethylene glycol, water and propanol;

a desensitizing agent for promoting the water-receptivity of the exposed surface regions of one lithographic character, this agent comprising at least one member of the group consisting of gum arabic, mesquite gum, sodium carboxymethyl cellulose, sodium alginate, ammonium alginate, sodium hexametaphosphate, starch acetate, phosphoric acid, salts of phosphoric acids, citric acid, citrate salts, tartaric acid, tartrate salts, oxalic acid and oxalate salts;

a humectant for maintaining the water-receptivity of the exposed surface regions of the said one lithographic character for a period of time long enough to allow the treated blank to be used for printing, the humectant being a dihydric or polyhydric alcohol;

and a high-boiling-point solvent, for promoting the ink-receptivity of the exposed surface regions of the other lithographic character, the high-boiling-point solvent comprising at least one member of the group consisting of diacetone alcohol, ethyl lactate, ethylene glycol monoethyl ether acetate, and diethylene glycol monobutyl ether.

2. A solution as claimed in claim 1, wherein the said dihydric or polyhydric alcohol comprises one member of the group consisting of diethylene glycol, glycerine, trimethylol propane, sorbitol, hexylene glycol, hexantriol, and monoethylene glycol.

3. A solution as claimed in claim 1 or 2, wherein the said desensitizing agent is phosphoric acid.

4. A solution as claimed in any preceding claim, wherein the solvent for removing the protective surface layer is water.

5. A solution as claimed in claim 1, 2 or 3, wherein the solvent for removing the protective surface layer is alcohol.

6. A solution as claimed in claim 1, 2 or 3, wherein the solvent for removing the protective surface layer is a mixture of water and alcohol.

7. A solution as claimed in any preceding claim, wherein the humectant is diethylene glycol.

8. A solution as claimed in any preceding claim, wherein the high-boiling-point solvent is ethyl lactate.

9. A solution as claimed in any one of claims 1 to 7, wherein the high-boiling-point solvent is diethylene glycol monobutyl ether.

10. A solution as claimed in any one of claims 1 to 7, wherein the high-boiling-point solvent is diacetone alcohol.

11. A treatment solution formulated in acordance with any one of Examples 1, 2 and 3 set forth hereinbefore.

12. A method of treating a planographic printing blank which comprises, in addition to two layers of different lithographic character, a protective surface layer intended to be removed, after imaging of the blank, so as to expose a lithographic surface composed of image regions of a first lithographic character and non-image regions of a second lithographic character, wherein following imaging of the blank the latter is treated with a treatment solution as claimed in any one of claims 1 to 11, so as to remove the protective surface layer, promote the water-receptivity of the exposed surface regions of one lithographic character, maintain the water-receptivity of these later surface regions for a period of time long enough to permit the treated blank to be used for printing, and promote the ink-receptivity of the exposed surface regions of the other lithographic character.

13. A method as claimed in claim 12, where-

in the said two layers of the blank are a vapour-deposited aluminium overlayer and an underlayer of plastics material, the protective surface layer of the blank being provided on the overlayer.

14. A method of treating a planographic printing blank, substantially as hereinbefore described with reference to Figures 1, 2 and 3 of the accompanying drawing.

15. A planographic printing blank treated by a method as claimed in claim 12, 13 or 14.

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1492529 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

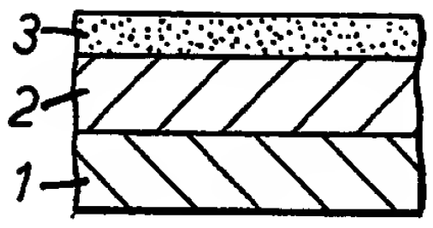

FIG.1.

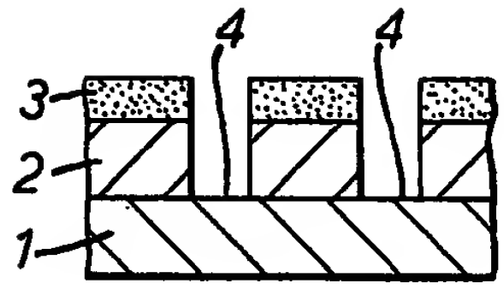

FIG.2.

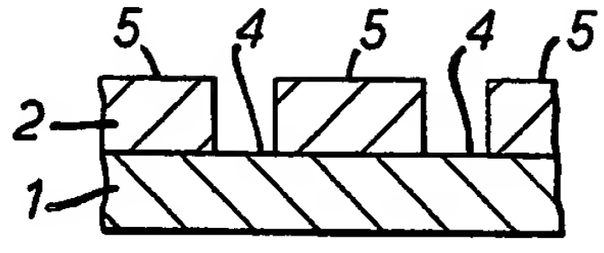

FIG.3.